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MASTER OF MILITARY STUDIES

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**TITLE:**

**REQUIREMENTS FOR A JOINT TERMINAL ATTACK CONTROLLER PRIMARY  
MILITARY OCCUPATIONAL SPECIALTY IN THE POST-OEF MARINE CORPS**

SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF MILITARY STUDIES

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## EXECUTIVE SUMMARY

**Title:** Requirements for a Joint Terminal Attack Controller primary Military Occupational Specialty in the post-OEF Marine Corps

**Author:** Major Erik Bartelt, United States Marine Corps

**Thesis:** The increasing complexity of the battlefield, Enhanced Company Operations, and future fiscal austerity require a JTAC primary Military Occupational Specialty.

**Discussion:** A Joint Terminal Attack Controller (JTAC) is the link between Marine ground units and the aircraft supporting them. This Marine must be capable of unsupervised, creative action in pursuit of his duties. Historical examples of terminal control indicate an extremely complex and fluid task that requires depth of personal expertise to perform adequately. The more dispersed operating environment since 9/11 prompted the USMC to train and assign non-aviator JTACs, in addition to aviator Forward Air Controllers, to terminal control tasks. The USMC has adjusted the JTAC program considerably in the last three years, ending in the 2012 Tables of Organization. Additional modifications are necessary to produce the expert controller required for Enhanced Company Operations. Behavioral psychology studies show that complex tasks cannot be learned in a short period of time. Army and Air Force JTAC programs have certain strengths that the USMC program could incorporate for additional capability.

**Conclusion:** The long-term trend from several directions shows that a JTAC primary MOS will best serve the Marine Corps' needs. Extending JTAC tour lengths and creating a primary MOS builds experience and realizes significant cost savings for aviation assets. Planned aircraft acquisition timelines could create stress on aviator populations contributing to FAC billets. Adequate numbers of personnel are available to create a primary MOS without affecting other skill sets.

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The services define a Joint Terminal Attack Controller (JTAC) as “a qualified (certified) Service member who, from a forward position, directs the action of combat aircraft engaged in [Close Air Support] CAS and other air operations.”<sup>1</sup> In Marine units, this individual is the link between the ground commander and supporting aircraft, and can authorize the release of aircraft ordnance as approved by the commander. This Marine must be capable of rapid, creative, unsupervised, independent action and able to keep track of many tasks at the same time. The new Commandant’s guidance includes the following statement:

“We will better educate and train our Marines to succeed in distributed operations and increasingly complex environments. We will invest more in the education of our NCOs and junior officers, as they have assumed vastly greater responsibilities in both combat and garrison.”<sup>2</sup>

The 2011 Force Structure Review Group (FSRG) recommends “revising our manpower assignment policies and training tracks to increase the skills and maturity of our junior leaders, particularly within our infantry squads and fire support teams”.<sup>3</sup> Ongoing contingency operations have demonstrated the critical need for well-trained JTACs to facilitate ground/ air integration. Civilian casualty incidents involving aircraft and JTACs have had theater- or strategic-level implications. The increasing complexity of the battlefield, Enhanced Company Operations, and future fiscal austerity indicate the requirement for a primary JTAC Military Occupational Specialty.

Several billets have equivalent responsibilities for terminal control of air-delivered ordnance. All four services have JTACs, most of which are enlisted. Marine aviators and Naval Flight Officers (NFOs) are called Forward Air Controllers (FACs) after qualifying in the same training syllabus, which is called Tactical Air Control Party (TACP) school. The Marine TACP school is a four week course attended primarily by mid-grade O-3 aviators, E-5 or E-6 and some

O-3 artillery forward observers. Each infantry battalion receives three FACs, two of whom work at the company level and one who serves as the Air Officer at the battalion Fire Support Coordination Center (FSCC). Some tactical aircraft squadrons qualify crews as a Forward Air Controller (Airborne), or FAC(A). Joint Fires Observers are personnel normally qualified to observe artillery fires who receive additional training to provide targeting information to JTACs who are not in position to observe a certain target area. The primary means of tracking controller experience is with a control, which “consists of at least one aircraft (fixed/rotary wing) attacking a surface target. The control begins with a CAS brief, also known as the “9-Line Briefing”... from a JTAC and ends with either an actual/simulated weapons release or an abort on a final attack run. No more than two controls can be counted per CAS briefing per target”.<sup>4</sup> The JTAC Memorandum of Agreement (MOA) requires twelve controls for initial qualification, and six live controls every six months for currency, including three fixed-wing, one night, and one live ordnance control (which can count concurrently). JTACs may log two controls every six months in approved simulators, making a minimum of only eight controls per year which must be actual aircraft.<sup>5</sup> Training syllabi also include simulator events.

The JTAC must have both flexible thinking and broad procedural knowledge to handle an amount and variety of aircraft he has probably never faced before in training. An example of the complexity of current CAS operations occurred at Combat Outpost Keating in northeast Afghanistan on October 3, 2009. Nineteen aircraft sorties dropped ordnance on 300 Taliban attacking the outpost. After initial enemy contact, control agencies vectored aircraft to the target area until ten fighters, two helicopters, and a B-1 bomber were on station at once. The JTAC was 20 miles away and coordinated via airborne relay from one of the fighters overhead, while getting targeting coordinates from personnel on the COP. There were at least two instances of

jets accepting incorrect target coordinates and one of the fighters acting as a Tactical Air Coordinator (Airborne) aborting them prior to bomb release. Several flights checked off-station to refuel, with only some returning afterwards. A thunderstorm passing through the area required aircraft to change stack altitudes, and obscured the ground at times limiting the possible ordnance and targeting methods used, with some flights having to drop bombs through the clouds without seeing the target.<sup>6</sup> Especially in a counterinsurgency environment where sustained contacts are relatively rare, a fight of this magnitude tends to draw all available aircraft to that vicinity. A JTAC on the outpost itself likely would have resulted in a faster engagement.

Historical examples show the difficulty of the terminal control of CAS aircraft. Vietnam OV-10 FAC(A)s remarked on the tendency of both CAS pilots and the ground chain of command to blame poor performance on the FAC(A), and that the FAC(A) often had no “wingman” to assist.<sup>7</sup> Often the ground element didn’t know exactly where it was due to the jungle, and CAS fighters had little awareness of the ground force either, but were only trying to hit the FAC(A)’s smoke mark.<sup>8</sup> A new FAC(A) described being completely overwhelmed on his first training mission in-country, although there was no ground force and only three CAS fighters. When the instructor took over and demonstrated the rest of the sortie, he stated that he had been controlling “every single day since I got here”, and that “experience alone is not going to make you any good over here unless you were good to start with”.<sup>9</sup> It is reasonable to assume that during most of a year the instructor would accumulate 200-300 controls at a minimum. One FAC(A) who was relieved of duty after poor performance remarked “The problem is if I do something wrong here, I’m going to end up hurting somebody else”.<sup>10</sup>

The vast range of employment options and gear available today require a more experienced terminal controller than the Marine Corps had prior to 9/11. JTAC equipment and



employment techniques have proliferated in the last ten years. JTACs must be proficient with three or four different radios, Falconview navigation software, the Precision Strike Suite for Special Operations Forces (PSS-SOF) imagery program for targeting GPS weapons, video downlinks, laser designators, GPS-coupled rangefinders, several infrared pointers, and Gridded Reference Graphic techniques, in addition to standard map and compass skills. Aircraft weapons still include unguided and laser-guided bombs, rockets, and guns of various sizes, but now include GPS-guided bombs of predictable and unpredictable trajectories, and missiles with various guidance types and warheads. Assorted aircraft targeting pods have different combinations of laser designators, infrared pointers, laser spot trackers, and coordinate generation capability. Not only does this equipment require greater background knowledge and specific techniques to use, but the JTAC must adapt and execute myriad degraded branch plans when any of his equipment, or the aircraft equipment, malfunctions. Advanced technology creates more options, but does not eliminate the requirement to be able to revert to Vietnam-era tactics, techniques, and procedures (TTPs).

Studies in behavioral psychology indicate that a fast, creative, thinker has some innate traits, but also needs time to develop their knowledge base. Expert decision-making consists of both reaching a solution quickly, and being able to synthesize a solution for a problem that has not been seen before. One study suggests that some individuals are inherently more able to deal with a complex multitasking environment.<sup>11</sup> Another suggests that expertise is based directly on depth of knowledge, which experts access rapidly in a self-regulating manner that appears intuitive. This study further observes that novices across many unrelated disciplines require baselines of procedures as “scaffolds” for information.<sup>12</sup>

Studies of commercial aircraft crews reveal the true nature of multitasking. There are many parallels to JTACs controlling aircraft in a complex environment. Procedures and checklists attempt to create lockstep operations, but an actual complex environment is semi-predictable (“tasks and events cannot all be exactly anticipated”) and semi-controllable (“Initiation of tasks is not entirely under... [JTAC] control”).<sup>13</sup> Repetition of tasks can create familiarity and speed by making parts of the process operate without conscious thought, as when more experienced pilots devote less conscious attention to flight control movements than a novice. Some tasks do require conscious thought: “1. when the task is novel, 2. when the task is perceived to be critical, difficult, or dangerous, 3. When a habitual ...response to a situation must be overridden to respond in an atypical way, and 4. to choose among competing goals or activities...”.<sup>14</sup> By these criteria, a JTAC is operating at the conscious processing level for most tasks. Errors during complex operations occur in four typical situations: “1. interruptions and distractions, 2. tasks that cannot be executed in the normal, practiced sequence of procedures, 3. unanticipated new tasks that arise, and 4. multiple tasks that must be interleaved.”<sup>15</sup> Most of these situations arise on any JTAC control, thus terminal control is an extremely dynamic and error-prone evolution. People multitask by doing single tasks in the appropriate sequence and switching between them at the appropriate time. Switching tasks at the appropriate time, and then remembering to switch back to finish the first item, are tasks in themselves and take up mental processing power. The study notes that checklists or monitoring by another crew member are the most effective safeguards against errors in a complex, time-sensitive task. Each new control introduces a slightly different problem that the JTAC has not seen before. There is a vast number of permutations of aircraft type and number, ordnance and guidance peculiarities, available fuel, available time, stack position, ground scheme of maneuver and tempo, Rules Of

Engagement restrictions, and weather. Instead of applying a known procedure as in an artillery call-for-fire, the JTAC must develop a creative solution based on experience and developed schema (mental templates) and heuristic rules-of-thumb.

JTACs were a key component in the overthrow of the Taliban in Afghanistan in 2001. Some Air Force JTACs attached to Special Operations Forces early in OEF conducted 10 to 30 controls per day for almost a month prior to the fall of the Taliban. Only a few months later, poor CAS planning occurred during Operation Anaconda, a deliberate assault on the Shahi Kot valley. Lack of coordination measures and late involvement of air planners resulted in multiple JTACs requesting fires in a small target area with little deconfliction.<sup>16</sup>

The USMC had few non-aviator JTACs prior to OIF I.<sup>17</sup> As OIF continued, the recognition that two company-level Forward Air Controllers per battalion was inadequate caused the Marine Corps to add a JTAC additional MOS for ground-combat-arms Staff NCOs and officers. Infantry units attempted to get TACP school quotas on an ad hoc basis. Washout rates at TACP school were high, due to lack of experience and training rather than basic personal deficiencies. Personnel who did graduate were often small unit leaders who had other responsibilities besides terminal control. There is still a significant amount of wasted resources due to failure, as stated in a 2010 study: "Failure rates are now approximately 10 percent. Training costs are estimated at approximately \$500,000 per student for the four-week qualification course."<sup>18</sup>

The USMC adjusted the JTAC program considerably in the last three years. The new structure recognizes that the same person should not execute the responsibilities of a small-unit leader and a JTAC. Most JTAC billets will now reside in the artillery regiments to improve centralized training. The 2012 artillery regiment Table of Organization (T/O) calls for a liaison

element with three qualified E-5 or E-6 JTACs and nine Joint Fires Observers (JFOs), which will join each infantry battalion prior to deployment. This structure allows for a JTAC or FAC with each infantry company, and a JFO with each platoon. The JTACs hold a secondary 8002 MOS and retain their 0861 (artillery forward observer) primary MOS. The artillery liaison chief is another E-6 who also holds the JTAC MOS but is not necessarily current. The liaison chief typically travels with the battalion FSCC and has primary responsibilities for artillery coordination, but could possibly provide some assistance to, and gain experience from, the battalion Air Officer.

Each artillery battalion has an E-7 prior JTAC who is also the JTAC evaluator and primary trainer. The artillery Regimental Air Officer shop is the focal point of training for non-deployed JTACs, and includes one E-8 JTAC on a three year tour to assist with training management. Ideally, each 0861 serves in a three year JTAC billet as an E-5 or E-6, so that any E-7 or higher continuing to serve has JTAC experience.<sup>19</sup> Second company-level JTAC tours will be “extremely limited”.<sup>20</sup> Given a typical career path with one or two 3-year billets outside the MOS, the primary trainer at an artillery battalion will likely do only one prior tour as a company JTAC, and in the post-OEF environment may only do one deployment as a JTAC. This method of spreading JTAC experience in most 0861s facilitates broad artillery community experience but will not concentrate training to produce the required level of expertise for Enhanced Company Operations.

TACP schools added a fourth week to the course in 2005, reflecting increased complexity of the CAS environment. The newly revised TACP syllabus contains 14 live controls augmented by approximately 21 simulated controls during the 1000-level JTAC qualification, conforming to the inter-service JTAC Memorandum of Agreement (MOA).<sup>21</sup> Controllers require additional

2000-level training before they are considered Combat Ready and designated a Marine TAC (MTAC) or Marine FAC (MFAC). The 2000-level lists about 14 simulator controls, and several specific skills train to with live aircraft as assets become available. The training program nests the minimum required joint MOA currency controls into the 2000-level. By not designating FACs/ JTACs as “Combat Ready” until after most 2000-level events are complete, the Marine Corps confirms that post-TACP school training prior to combat deployments is essential. Pre-deployment training at the Enhanced Mojave Viper exercise should result in completion of most of the 2000-level events, although trainers there suggest that many JTACs are still not completing 2000-level training prior to deploying.<sup>22</sup> Live events that are listed as optional, but not required for either MTAC or MFAC Combat Ready certification, include difficult and likely events: day and night landing zone control, and multiple section integration. These events are optional due to the difficulty of scheduling assets, but do leave experience gaps in Combat Ready JTACs if they are not completed. Several events that are required for FAC Combat Ready training, but not for JTACs, such as airspace management, FAC(A) integration, and unmanned aircraft integration,<sup>23</sup> indicate that the JTAC role is slanted towards lower-level execution and is not expected to be proficient at some higher-level planning and coordination functions.

Since the first year of a new JTAC’s tour is likely spent in TACP school and then finishing up the 2000-level syllabus, he is very much in a student status for much of his three year tour. The training syllabus provides a baseline of knowledge, but several events take more experience to get good at. Relatively new JTACs tend to have difficulty in several specific areas. A troops-in-contact situation usually doesn’t allow for detailed planning, and aviation fires are needed quickly. The standard in the training manual for most 2000-level events is 15 minutes from aircraft check-in until issuing the nine-line brief,<sup>24</sup> which is often too slow to support a

rapidly developing situation. When there are two or more aircraft elements in the same target area it is the JTAC's responsibility to deconflict them. Newer JTACs often ignore one flight for extended periods while talking to another, especially when flights arrive and depart at different times. The JTAC should get unmanned aircraft out of the way of falling bombs, and definitely needs to get them out of the way of a diving manned aircraft. Transport helicopters in the target area force the JTAC to coordinate their approaches with CAS aircraft attacks. Maneuvering ground forces change the allowable fires geometry, and a targeting solution that worked as little as one or two minutes ago may be inappropriate.

How many controls constitutes proficiency? The author noted a jump in confidence and better ability to improvise after approximately 50-60 controls spread over at least 4 or 5 training events, based on FAC(A) training with already experienced pilots new to joint FAC(A) procedures. The Army's Ranger Regiment trainers desire between 40 and 75 controls before even initiating JTAC qualification.<sup>25</sup> Marine "Playboy" FAC(A)-equivalent crews in Vietnam also had a strict qualification program:

".....Normally, 10 strikes were controlled under supervision of a designated TAC(A) as a precondition for qualification by the 1st [Marine Aircraft Wing]. Though it may have seemed that the TAC(A) designation was too jealously guarded, it was this adherence to high standards that was the lifeblood of an effective program. It took some crewmen as many as 30 Playboy missions to accrue 10 strike control evolutions."<sup>26</sup>

Ten strikes probably resulted in at least 50-60 individual controls. Another experienced instructor believes it takes more than a year after initial schooling for a JTAC to develop some proficiency and credibility within a unit.<sup>27</sup>

JFOs are typically E-3s or E-4s, and are the main feeder population for new JTACs. With the organization of one JFO per platoon and one JTAC per company, the Marine Corps requires roughly one-third of JFO-qualified personnel to fill the JTAC pool as they advance in

rank and experience. The JFO syllabus contains academic instruction and seven training events in the simulator for qualification, with another 15 simulator and four live aircraft events after qualification in the 2000-level syllabus. The formal JFO agreement encourages but does not mandate any live aircraft events.<sup>28</sup> While some JFOs will self-select out of JTAC training due to their end of service, there are still several candidates to choose from for each JTAC billet. These students are currently evaluated based on their entry-level ability to perform what will be a very complex skill set.

How is the Marine Corps selecting the most capable JTAC trainees? Initial screening of the entry-level 0861 and follow-on screening as an E-4 after some JFO experience should provide a better picture of JTAC candidates than we currently acquire. Several experienced trainers have made comments to the effect of “Some guys just get it, and some guys never will”.<sup>29</sup> This indicates a failure to properly select personnel before expending resources on advanced training. Trainers proposed a standardized entry-level JTAC test at least as far back as 2005.<sup>30</sup> Similar tests assist in selecting aviation students. The current selector is a minimum General Technical (GT) score, although other Armed Services Vocational Aptitude Battery (ASVAB) elements may be predictive: “The ASVAB CL [Clerical] score appears to be a good indicator that could be used to compliment the ASVAB GT score, just because of the high number of Marines that had a CL score of 102 or greater. The TACP community could consider adding a minimum ASVAB CL score as well.”<sup>31</sup> The key element of a JTAC selection test should be the ability to multitask. This involves qualities such as selective attention, short term memory, and deferred attention. One study concluded that working memory is predictive of individuals who are good at multitasking, along with fluid intelligence.<sup>32</sup> FAA screening tests for Air Traffic Controllers identify the ability to pay attention to many aircraft at once.<sup>33</sup> A

standardized test called SynWin test allows flexible measuring of multitasking ability without having a specific knowledge base.<sup>34</sup> Experienced FACs and FAC(A)s such as those in the MAWTS-1 Air Officer Department could take the test to establish a baseline score. Individuals outside the artillery and reconnaissance communities could also take a standardized mental capacity test, increasing the available pool of JTAC candidates. Radio operators and Direct Air Support Center (DASC) personnel are possible JTAC candidates due to some skill transfer.<sup>35</sup> Combining an entry-level selection process with an incentive bonus requires a JTAC primary MOS, as bonuses are typically targeted towards a primary MOS.<sup>36</sup>

A common anecdotal argument states that assault support pilots (from CH-53, CH-46, MV-22, and KC-130 backgrounds) have minimal required skill sets as a terminal controller, thus are no better suited to this job than TACP-trained ground personnel. Having observed several assault support pilots who are successful FACs, the author argues that it is their multitasking ability that makes them successful. A behavioral study of JTAC qualities states “Aviators are exhaustively screened for specific KSAs [key skill areas] that translate naturally to duties FACs perform. Such KSAs include spatial abilities, visualization, mental geometry, reasoning, mental math, and the ability to quickly process a great deal of information in a rapidly changing environment.”<sup>37</sup> These pilots have also been training in aviation communication cadence and three-dimensional airspace deconfliction for at least three years before their FAC tour. In this case the assault support pilot has been training in these skills at least as long an E-5 JTAC trainee has been preparing fire support knowledge.

Comparison to other service JTACs shows differences in their training programs. The US Army’s Ranger Regiment has a program to train its own JTACs. The timeline is longer than the USMC program. E-4s become JFO qualified, and new E-5s attend the Joint Firepower



Control Course (elements of which are rolled into the USMC TACP school). Trainers see JFO and JFCC schools as refresher training rather than a separate needed capability. From three to five years time in service, each prospective JTAC gets practice controls during exercises. A senior E-5 with approximately five years in fire support billets and 40-75 training controls is sent to a formal JTAC qualification course.<sup>38</sup> While there are more opportunities for live training events in the Rangers, the typical student at a JTAC-producing school has two more years of experience and many more live training evolutions prior to school, compared to a USMC trainee.

Air Force JTACs have a primary MOS, but the service emphasizes combined-arms engagements less than the USMC. Most USAF trainees do not train with actual indirect fire assets during qualification.<sup>39</sup> One trainer noted that many qualified USAF JTACs newly assigned to Army Ranger units are overwhelmed with multiple aircraft elements and integration with indirect fire,<sup>40</sup> showing a simpler approach to training in the USAF schools. Upon assignment to an Air Support Operations Squadron, USAF trainees require approximately three years to become JTAC-qualified. After entry-level school, the trainee is assigned to a JTAC for approximately two years as his radio operator. Progression at this point is dependent on the skills and capability of the supervising JTAC. The training emphasis is on operating autonomously, and USAF JTACs are expected to plan at any level up to division, besides directly controlling for a platoon- or company-size unit. Initial JTAC qualification is typically as an E-4. Many JTACs are still assigned to Special Forces A-teams as E-7s. Since only one Air Force pilot is assigned to an Army infantry battalion as an Air Liaison Officer (instead of three aviators in Marine units), enlisted controllers frequently fill AirO responsibilities, often as a break from controlling in forward areas. Sustained contingency operations since 2001 have also necessitated qualifying USAF JTACs with less experience.<sup>41</sup> Over time the Air Liaison Officer

program became less robust, as Air Force pilots do not have the initial infantry-centered schooling of Marine pilots, and many fly aircraft that have no interaction with ground units. By making the Air Liaison Officer a primary non-pilot career field in 2010, the Air Force has kept officers in the AirO-equivalent billet longer, but decreased the cross-pollination between USAF pilots and Army infantry units. USAF JTACs rotate into the Air Support Operations Center, a rough equivalent of the USMC Direct Air Support Center (DASC). A similar program could create avenues for billets outside the artillery regiments for USMC JTACs to rotate into and gain “big picture” aircraft routing and planning experience, and qualify DASC Marines into the JTAC MOS if the artillery community encounters a personnel shortage or retention problem.

Simulators are a key component of USMC JTAC training. TACP school, the follow-on 2000-level syllabus, and proficiency training all emphasize simulator events. Simulator operators believe that simulator events prior to a formal TACP course increase understanding and performance at the formal course, although it is difficult to quantify the value of the simulator versus an actual aircraft control. Observations by simulator instructors after initial TACP school indicate a substantial spectrum of individual proficiency during 2000-level events. No simulation is perfect, but it is usually possible to run more of a given mission in a certain time, to freeze the simulation, or restart an event if the student manifests problems.<sup>42</sup> Rehearsing radio communications and procedures before a similar live event is the greatest benefit of simulators.<sup>43</sup> Studies in recent WTI classes indicated that this rehearsal resulted in faster live engagements versus not using simulators at all.<sup>44</sup> This is effective for baseline training, but simulating a combat control shortly before execution is unlikely due to many unknowns. The simulator, especially the domed variety, looks impressive, but the real value is the instructor, not the simulator itself. The JTAC is usually not co-located with his Air Officer in a dispersed,

deployed scenario. Without an experienced instructor, the simulation does not enhance student learning. The JTAC just goes through the motions.

The much larger number of JTACs forces tighter control of available aviation assets.<sup>45</sup> Proactive units will get more training, but overall there is less opportunity for JTACs to get large amounts of controls. With the T/O due to take effect in 2012, there will be a total of 547 JTAC/FAC billets (including 285 JTACs), an increase from 260 FAC billets before OIF I.<sup>46</sup> This increase in JTACs has required the USMC to contract training aircraft using inert bombs to fill some training control requirements.<sup>47</sup> Pressure to not source more than twelve, or even eight, actual controls per JTAC per year (the sunk cost of maintaining the program) will grow with looming budget cuts. Each new JTAC and most FAC billets require at least 20 controls during the first year (initial qualification plus the desired 2000-level Combat Ready training). If the JTAC receives only the minimum live control opportunities, he is fully qualified and current during his three-year tenure with only 30 live controls (fourteen initial controls at TACP school, plus eight for currency during the other two years), plus simulated controls. With a 1:2 dwell ratio where each Marine deploys one-third of the time, the USMC will get one deployment out of this JTAC at a point where he is established, confident, and capable of acting independently. Longer tour lengths will increase overall proficiency, and reduce TACP school requirements. Maintaining continuous JTAC currency for six years instead of three years avoids half of the current JTAC TACP school seats and re-prioritizes approximately \$24 million per year in support costs (at \$500,000 per school seat). Using the current personnel model of one E-6 and two E-5 JTACs per deploying infantry battalion,<sup>48</sup> mandating that the E-6 is a second-tour JTAC leverages the three years of experience he gained in his first billet. Feeding some qualified JTACs into Air/ Naval Gunfire Liaison Companies (ANGLICOs) or Marine Special Operations

Command (MARSOC) units for a second JTAC tour maintains diversity of assignments and eases training requirements for the gaining unit. MARSOC assignment policies currently allow JTACs to stay there for five years, creating much greater experience and proficiency than at an artillery regiment.<sup>49</sup>

Enhanced MAGTF Operations also dictate a more experienced JTAC with more than three years “on the radio”. This concept increases distance between companies in an infantry battalion. The battalion operates in a radius up to 165 nautical miles (NM), and the company up to 15NM.<sup>50</sup> Line-of-sight VHF-FM tactical radios can typically reach less than 15NM.<sup>51</sup> As an Air Officer, the author typically monitored aircraft UHF traffic at 30-40NM but man-portable radios often do not have sufficient transmitting power for two-way communication at this distance. Besides requesting aviation assets, the AirO’s other main function is to ensure that a company-level JTAC is not endangering adjacent companies with either proximity of impacts or fires geometry.<sup>52</sup> With a battalion in close proximity, most FSCCs practice positive approval of missions instead of silence-is-consent, and JTACs expect a positive “Mission is approved” from the Air Officer prior to authorizing release of ordnance. Distance may decrease these deconfliction requirements, and battalions can establish company-specific areas allowing for fires approval at the company level. However, another very useful function of the Air Officer involves “teamwork CAS”, described in 2004 after Operation Al Fajr in Fallujah.<sup>53</sup> By active listening on the JTAC’s frequency, the Air Officer can facilitate follow-on aircraft, observe downlinks that the JTAC may not have working, and derive precise target grids for GPS-guided weapons, which decreases the JTAC’s workload greatly and serves as a check-and-balance on the JTAC who may be taking fire. There will certainly be a communication link between the JTAC and Air Officer if the range is too great for line-of-sight radio (SATCOM, high frequency

radio, or Internet chat), but the Air Officer loses much of the nuance of the JTAC/ aircraft interaction if he can't listen directly. Many Air Officers facilitated in this manner in Fallujah, Ramadi, and ongoing ops in OEF. Dispersing the infantry battalion beyond line-of-sight distance removes a very valuable backup process, and requires a more experienced JTAC who needs less assistance, which second-tour JTAC experience at the company level facilitates.

The concept embedded in the training manual where the Air Officer plans and the JTAC executes may not be feasible with Enhanced Company Operations. The Air Officer can function as a request conduit for dispersed companies, but may not offer detailed planning assistance if he has little familiarity with the local area. When a company commander wants to talk "air" he will look at the JTAC, and the JTAC needs to have the experience to plan as the single available representative. A 2008 joint OIF fact-finding trip report noted that USAF Senior Airmen [E-4] and Staff Sergeant [E-5] controllers assigned to Army units "...are generally unable to contribute significantly to air/ground planning".<sup>54</sup> Debriefs from Enhanced Mojave Viper training events indicate that E-6 controllers are more willing to speak frankly to an O-3 company commander.<sup>55</sup>

Recent after-action reviews from OEF operations already indicate the trend towards Enhanced Company Operations. Operations showed a complex, kinetic environment with required integration of multiple air and ground assets in close proximity to friendly units. Reports from mid-2010 mentioned frequent indirect fire integration with casualty evacuation helicopters landing at random point-of-injury zones, CAS attacks supporting casualty evacuation helicopters, control of blocks of airspace delegated from the DASC to infantry battalions, non-USMC diverted CAS aircraft (which negates the habitual relationship with USMC CAS), deconfliction of aircraft from guided and unguided cannon and rocket artillery, and JFO integration. The company FAC or JTAC often operated from a company FSOC instead of

moving on patrols, due to the great number of squad-sized patrols and outposts.<sup>56</sup> In this paradigm the JTAC has to take on many roles of the theoretically more experienced Air Officer, manage multiple contacts at once, and deconflict aircraft, mortars, and artillery in his battlespace. This kinetic counterinsurgency environment required similar JTAC skills to those needed for more conventional, forcible-entry operations (as called for by the “two-fisted fighter” concept).

The OEF environment has several advantages over future theaters. Units can spend their entire workup period slanting their training towards particular terrain, and ideally train with at least some of their supporting aviation units. Updates and turnover with the outgoing unit can happen months in advance, allowing a high level of preparation. JTACs in theater now are talking to aircraft much more frequently than they will in a post-OEF training environment, in effect making up some of the pre-deployment training deficit in theater in a way that will not be possible for future pop-up contingencies. These attributes may allow individual success at a certain level of competency where a brand-new area would not.

The use of the artillery liaison chief as the senior infantry battalion JTAC probably would have worked well in Iraq where most units were located in or around dense urban areas and the use of artillery was limited. In contrast, OEF, with its more dispersed rural population, split artillery battery operations, and widespread fielding of precision artillery rounds such as Excalibur, affords more opportunities to employ artillery in its traditional role. The experience of a prior JTAC as the artillery liaison chief is valuable, but artillery liaison duties will limit his ability to assist or trade-out with the battalion Air Officer or mentor dispersed company-level JTACs. Split-battery operations or the requirement to put liaison teams at multiple company positions will further reduce the ability of the liaison chief to mentor JTACs, and further increase the necessity for artillerymen to become experts in artillery duties at earlier ranks.

Several considerations could create stress on the aviator population, reduce the pool of available aviators to turn into FACs, and increase the need for experienced JTACs. The Marine Corps fields an entire new generation of aircraft, including the UH-1Y/AH-1Z, KC-130J, MV-22, and F-35, before 2020. The aircraft are generally more complex and more expensive to fly. While simulators will be widely available, it is reasonable to suppose that more complex aircraft will take longer to master and there will be pressure to keep aviators in squadrons longer on their first tour. AH-1Ws will be taken out of service for the rest of the decade to be remanufactured into AH-1Zs, decreasing the AH-1s available for CAS training and JTAC controls, and increasing the time needed to train new AH-1 pilots to a given level of proficiency. Fleet Replacement Squadrons and program offices for the AH-1W, UH-1N, F/A-18, EA-6B, and AV-8B will remain in place at the same time newer aircraft squadrons are standing up, creating additional pressure on aviator staffing. The training squadrons for new aircraft are a sunk cost for the mid-2010s regardless of budget cutbacks or new program delays. Especially with the F-35 it is likely that pilots will remain at the squadrons longer to build community experience, decreasing F-35 FAC tours for the first several years of that program. One trainer remarked that the F-35 expense and capabilities will both change JTAC TTPs and decrease training sortie availability.<sup>57</sup> NFO accessions started to decrease in FY 09 from 35 per year to zero by 2018.<sup>58</sup> Remaining NFOs (especially F/A-18D) may get pushed to FAC tours but the long-term trend is towards fewer available. One of the current light/ attack squadrons converted from a Reserve squadron that was already heavily involved in CAS sorties for active-duty JTAC training, so the net increase in CAS sorties from this squadrons is not as great as it appears. The single-seat AV-8B and F/A-18C FAC(A) programs have created additional sortie draw against available JTAC sorties. It is likely that this requirement will carry over into the F-35. JTAC qualification of

Unmanned Aerial Vehicle mission commanders further increases competition for CAS training sorties. The 2011 FSRG cut 3 infantry battalions, but added an ANGLICO company and increased MARSOC endstrength, so demand for JTACs will likely not decrease.<sup>59</sup> Planned new pilot accessions are virtually unchanged from FY 09 to FY 18 (323 to 344), showing that current additional squadrons mostly come from efficiencies in pilot billets, and may decrease again with the FSRG results.<sup>60</sup> The 2011 FSRG recommends disbanding nine flying squadrons while shrinking to 186,600 Marines, versus the current 202,000 Marine plan.<sup>61</sup> Many unknowns remain regarding future budget cuts, but these will likely contribute towards either a smaller population of available pilots or sending less experienced ones to FAC billets.

There are some cons to creating a primary MOS for JTACs. The generally accepted “critical mass” to make a primary MOS is 300 personnel, whereas the current number of JTAC billets in the 2012 T/O is 285. The total 0861 population after increases to support JTACs is approximately 800 by FY14,<sup>62</sup> indicating that fencing off a separate primary MOS of approximately 300 is possible while maintaining a viable 0861 MOS (especially since some JTACs would come from the 0321 reconnaissance MOS instead of detracting from the 0861s). Creating an acceptable career progression “pyramid” is also a consideration.<sup>63</sup> Since it is current practice to have an O-3 FAC at the company level, there shouldn’t be a reason not to have an E-7 as either the liaison chief or even a company JTAC. There are additional senior billets that would further facilitate a JTAC career path. The Assistant Air Officer for each MEU is currently an O-3 who is also the Maritime Raid Force FAC, but this billet could be filled by an E-7. The five standing Marine Expeditionary Brigade headquarters mentioned in the 2011 FSRG report could also use an E-7 or E-8 as the Assistant Air Officer. Additional E-7s or E-8s as TACP school instructors, and E-9s with the Division FSCCs and Marine Aviation Weapons and Tactics



Squadron 1 are further appropriate senior JTAC billets. Creating a primary MOS also makes JTACs available for tasking to non-MOS billets, however Marines do these anyway for promotion eligibility, and even if a disproportionate share of non-JTAC 0861s were tasked to non-MOS billets, there would be regular 0861 billets that JTACs would probably need to fill.

A primary JTAC MOS demonstrates the importance of the skill to the Marine Corps. With the slower operational tempo after OEF, it is likely that a JTAC will take most or all his three year tour gaining broad experience, but will not return that experience to the Marine Corps as an expert at the company level where it is needed. A second tour “on the radio” at the company level maximizes the USMC’s return on investment and sets the individual up with broad knowledge for the E-7 and E-8 trainer tours. A downsizing Marine Corps will allow selective retention of more capable individuals. The current proliferation of procedures and the complex, kinetic environment, coupled with increasing dispersion of units, require an individual who can creatively plan and execute in a multitude of situations.

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